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SCIENCE

NEW YORK, OCTOBER 7, 1892.

IS THE MAYA HIEROGLYPHIC WRITING PHONETIC?

BY PROFESSOR CYRUS THOMAS.

I HAD not expected to ask any more space of *Science* at present for the further discussion of this subject. Nevertheless, as the interpretation of the aboriginal codices and inscriptions is now the most desirable thing relating to North American archæology, a few more pages may perhaps be profitably devoted to the subject, if confined to an earnest endeavor to arrive at the truth.

I have asserted that I find the Maya hieroglyphics to be in part phonetic, and that I have ascertained the interpretation of a sufficient number to form a key to the solution of the problem. This statement I firmly believe I can maintain, and trust I will be able to do so in the paper I am preparing for publication by the Bureau of Ethnology. In the meantime I have the kind permission of the Director, Major Powell, to present through the public press such samples as may be deemed sufficient to afford those working in the same field an opportunity of judging of the correctness of my claim. As Dr. Seler has (in *Science*, Aug. 26) seen fit to question this claim, some additional evidence is presented in this paper. I regret to say, however, that his criticisms appear to have been offered without proper consideration and to be based to a large extent on assumptions backed by no proofs.

As the attempt to reply to mere assumptions would drift the controversy into statements of personal opinions, simple reference to some of these and to some of his mistakes will suffice.

He asserts that the second element of the symbol interpreted *Cutz* (his Fig. 19) is not given in my letter-list, when in truth it is number 24 of that list. Referring to my interpretation by 2-*Yackin*, of his Fig. 29, he says it "is obviously erroneous," as "there does not exist a numeral designation with crosses between the dots;" when a dot and two crosses with a month symbol form a date in the bottom line of plate 49 Dresden Codex,—1 Mac. His statement that the first glyph shown in my Fig. 2, p. 46, is the same as that in certain groups he mentions, and as his Figs. 31–33, is incorrect, as he has failed to include the prefix. The character in his 31 is the same as my figure, but his 32 and 33 are different, as here the prefix, which is materially different from the others, forms part of the symbol and gives a different word. If I am right in my interpretation of this prefix by *ha*, it is possible,—although the translation this gives to the combination is not found in any lexicon I have at hand,—that the signification is suggested by *hacab*, "a sword, weapon to wound with, whip,"—Henderson (MS. Lexicon in possession of the Bureau of Ethnology) adds "rod." This agrees very well with what we see in the hands of the figures below, and also with what seems to be the general tenor of the series.

Dr. Seler is correct in stating that the sign of aspiration (his Fig. 16) found in Brasseur's "Landa," is not in the original text; nevertheless, we have to thank the Abbé for a happy suggestion. But his assertion that it is a substitute for the character shown in his Fig. 17 cannot be accepted, as both (16 and 17b) are found connected with the same glyph, as in Troano 17 and 16 and in Dresden 26 and 28. I may add that Dr. Seler has gone farther than Brasseur, as he has given us in his 17_a a character which appears to be new,—at any rate I have been unable, by a careful search, to find it in any of the codices. It occurs in the general form given, but I have failed to find it with the two little interior dots and parallelogram. In a very few instances the parallelogram is present, but never the dots,—usually the only mark in the circle is a short curved line. These differences are minute

but important. As yet I have been unable to interpret this character, but think *u* is its chief element.

Speaking of the *e* symbol, he says "it occurs in various compound hieroglyphics" as those shown in his Figs. 26–28. His 26 (from Troano 31*) he says "refers to the rope trimmed with thorns (!) that the penitent used to draw through the pierced tongue." It would seem from this that he has taken the marks showing the twisted strands for thorns, as there is absolutely nothing else in the figure which could possibly suggest this idea. A moment's thought would have reminded him that, if the artist intended to show thorns, he would have projected them from the sides as in Charnay's figure to which he refers. The second part of his Fig. 26 is an *e*, the whole symbol (our Fig. 10) is probably correctly rendered by *Xel* (or *Xelem*), "to part, separate, cut, divide." The left member of the symbol has *x* as its chief phonetic element, but generally, as it seems, with *m* as a subordinate consonant sound. This interpretation agrees much better with the figures below the text than Dr. Seler's suggestion; and when we add that the character to the left of it (our Fig. 9) is to be interpreted *Zum* or *Zuum*, "rope, cord, line" (see the *m* in my letter-list), there is perfect agreement between the text so far as rendered and the figures, and the interpretations are all consistent with my letter-list. Referring to our Fig. 6, we have the two chief elements of these symbols combined in the word *Xamach*, "a vessel" which is found in more than one place accompanied by a vessel (see Codex Cortez 27).

It is by no means, as he claims, a "curious coincidence" that three words, expressing as many different actions, "should all contain an *e*." In fact, each of the three English words Dr. Seler uses to express the actions referred to—"pierce," "weave," "embroider"—contains two *e*'s. This objection on his part is therefore frivolous.

When he points out with perfect assurance "the prey-gods of the five regions," the "hunting god," "the dog of heaven that carries the lightning," and marks as stones what one at a single glance ought to recognize as the ends of cross-beams, or "weight-poles" with the wood symbol *Che* on them, it seems (and I say it with due regard to courtesy) unprofitable to attempt to follow him. To assume that his Fig. 29 is a variant of 30 is certainly straining a point to the utmost tension. Nor is he correct in stating that 30 is the glyph I interpreted in a former communication, "moisture"—that character was from the Cortesian Codex, p. 32. True, the parts are similar, but the details and surroundings are different. *Y'b*, as we have not learned the determinatives which indicate the vowel sounds, may be *Yeeb* "moisture" (Cortez 32); *Yib* "to liquefy or melt" (as honey, Troano 3*); *Yib* (or *Yb*), "a bean" or "beans" (his Fig. 10 and Dresden 18 and 19); we must therefore decide by the accompanying figures and details. A more thorough study and comparison of the characters will perhaps enable us ultimately to find the determinatives. The little crosses over 29 and 30 may have been placed there as helps in this respect; of this, however, I am unable to speak with any confidence, nor do I feel entirely satisfied with the rendering *Yax-kin*, although the parts are *Y'* and *kin*, and Dr. Seler's objection is not tenable.

He speaks of the fourth character of my Fig. 4 as being the same as a number of other characters he refers to, particularly the series on Troano 35* and Cortesianus 22. And he says "it is scarcely probable that in all these cases the reading *Xaan* should correspond to the matter expressed." It is apparent from this that he has overlooked a minute but important particular in that interpreted by me, which occurs but very few times in the codices. The little item at the front of the face, which is a very essential portion of the glyph, has not been carefully examined by him or he would not have fallen into the error of considering

those mentioned as the same. He had but to look to Fig. 3, same article, to see a difference, but he seems to have criticised the article without having thoroughly read it. There are a number of variations in this little character, whereby different words, as *Xaan*, *Xan*, *Xocan*, *Xolein*, *Xolan*, etc., are indicated. See, for example, Troano 4^c, 5^c, 7^b, 30^c, 31^c, 33^b, 32^c, 14^c; Dresden 4^b; all of which differ from one another. I must confess that his eyes are sharper than mine if he can find any figures in either of the codices representing a god or any one else beating a drum. This, like other of his assertions in regard to the significance of other figures, appears to be "merely hypothetical."

His assertion that Landa's first *a* is the head of the turtle, I think correct, as I long ago suggested (6th Rep. Bur. Eth., p. 348). I think he is also correct in assuming, as I had previously done, that his Fig. 6 indicates the Quetzal, and his Fig. 8 the *Moo* or large parrot (same report, pp. 355 and 356).

Dr. Seler, in closing his criticisms, expresses the opinion that "it would be far more appropriate to point out the real meaning as to the matter expressed, of each glyph." How are we to determine this real meaning? And by what evidence are we to verify our conclusions? His efforts in this direction appear to be far from satisfactory and lack that proof which brings conviction—in fact, in most cases are "merely hypothetical."

That the writing is largely phonetic can, I think, be proved without the interpretation of a single character. First, we have the statement of the early Spanish writers to this effect, Landa backing his assertion by an attempt to give the letter elements, and by a full series of the day and month symbols, which are verified by the codices. It is not likely that he was wholly in error in regard to the main fact where so many of the details have been verified. It appears from a statement by Father Alonso Ponce, quoted by Dr. Brinton,¹ that these characters were actually used by missionaries to impart instruction to the natives. In fact, the author quoted says "some of our priests understood and knew how to read them and also to write them." The internal evidence appears to confirm this view. The evident use of the same prefixes and suffixes to different characters leads to this conclusion. The fact that supposed deity symbols are very frequently followed by particular characters which may be supposed to indicate certain attributes is another evidence on this point. Other indications of phoneticism are found in the various combinations of the different elements; the use in some places of a seemingly conventional symbol to indicate an object (for example, the head of a figured bird) while in other places a character bearing no resemblance to the object is used; the fact that the terminal elements of the symbols for east and west are alike, and the final syllables of the words are the same, and also that a like repetition of elements is found in some of the month and day symbols where the sound is repeated,—*Cib*, *Caban*; *Pax*, *Chichan*; *Yaxkin*, *Yax*. Phoneticism appears, also, to be indicated by the fact that different characters are used to indicate certain months. Finally, the general character of the writing seems to forbid the idea that it consists of merely conventional symbols or that it can be explained on any theory short of a degree of phoneticism.

Assuming that it is phonetic, we are justified in making attempts at interpretation, but these to be successful should, I think, be based largely on certain considerations which will aid in obtaining correct solutions. Of course, the chief reliance is on the fact that the parts give appropriate results in new combinations, but the considerations I mention will furnish some aid in the work.

First, it is apparent to all careful students of these codices that they are formed upon a conventional plan. This is found to be, in general, as follows: What may be called a series or chapter is preceded by one or more columns of day symbols, over which are the numerals to be attached to them. From these, running along to the right, immediately below the text, is a series of black and red numerals, indicating certain days, as explained in my "Aids to the Study of the Maya Codices" (6th Ann. Rep. Bur. Eth., pp. 275-283). It is apparent from this order, the subdivisions of the plates, the arrangement of the pictures below the text, and

the method of grouping the written characters (see "Study MS. Tro.," pp. 137-138) that the subject of the text (usually arranged in groups of four or six compound characters over a pair of numerals, one red and one black) refers in some way to the day or period represented by these numerals. Second, very many of the pictures show masked individuals who represent certain deities or characters. Even where these pictures refer to the manners, customs, and industries of the people, the mask is usually worn by the male. As the forms of these masks are comparatively limited in number, we soon learn, by the repetition of certain characters in connection therewith, the symbols which denote these personages (or deities, if such they be). Third, there is often a certain parallelism in the groups of a series, which will, in some cases, enable us to determine the general subject of a series where but one or two characters can be deciphered. It will also, in some cases, enable us to decide with every assurance of being correct what certain characters of the series specifically refer to. This, as every one can see, is a great help in the attempts to decipher the text. Fourth, the general subject of certain series may

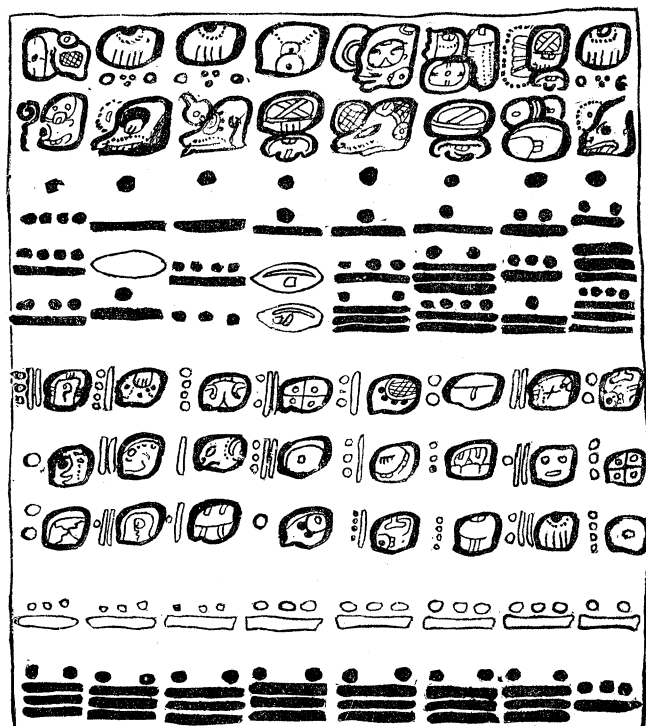


FIG. 1.

be inferred from the pictures; nevertheless, great caution is necessary in using this aid, as the Indian method of representing by figures ideas and actions was far different from that which would be adopted at the present day. The interpretation of a single character of a series will sometimes cast to the winds the conclusion we had reached in regard to the subject referred to. Fifth, the postures and clothing of the human figures represented and other details make it evident that the people were Indians in the full acceptance of that term; a fact which should lead us to the conclusion that the purport of the text is of that grade of thought and expression characteristic of the Indian culture-status. Sixth, the natural history and physical conditions and characteristics of the peninsula of Yucatan must be borne in mind; and, lastly, the historical evidence must be referred to, especially Landa's "Relacion."

To illustrate the aid afforded by the first of the foregoing items, and at the same time give interpretations of some characters reference is made to Fig. 1, which is the lower half of Pl. 55 of the Dresden Codex.² For the benefit of readers not familiar with the codices, we may state that the two upper transverse lines are glyphs forming the text; the four lines next below, of black dots

¹ *Maya Chronicles*, p. 63.

² A copy of the full plate is given on page 310 of the 6th Am. Rep. Bur. Eth.

and short lines, are numerals; the next three lines are day characters with accompanying red numerals; and the two lower lines are numerals (the outline or hollow numerals are red in the original). Taking the series by columns, we observe that each pair of glyphs, reading downwards, has its own series of numerals and day symbols. Hence we conclude that each pair forms a sentence, and that here the reading is downward or by columns.

Taking the left-hand column, we interpret it as follows, beginning with the character at the top: *Kilchalac*, "Malignant ulcer, sore, or wound." The next character below, *Bancimil*, "Pest, mortality, fatal epidemic." Before proceeding, it is necessary to remark that the first character as given in the figure is slightly erroneous. The little circle over the hatched portion has, in the original, the little parallelogram and two dots characteristic of the *l* (see *Science*, July 22, 1892, p. 44, Fig. 1, No. 13^c). Continuing downwards we have next one dot = 1, then four dots = 4, then a short line and four dots = 9, then a short line and three dots = 8. Next is 13Cib, then 1Caban, then 2Ezanah, three days with their accompanying numbers. Lastly, below these we have the red numeral, 8, and black numeral, 17, denoting 8 months and 17 days, the period which intervenes between two columns. It is only necessary to say here that the black numerals immediately below the text in this column denote 24 years, 9 months, and 8 days (see explanation in "Aids to the Study of the Maya Codices," 6th Ann. Rep. Bur. Eth.).

As this series, which runs through several plates, is divided, with few exceptions, into periods of 8 months and 17 days, it is reasonable to assume, if the text bears any relation thereto, that the portion of the text in a given column refers to something occurring in the period of 8 months and 17 days denoted by the lower numeral symbols. This gives us a clue to the signification of the two written characters at the top, which, taken in connection with what follows below, may be read "At this time occurred the deadly ulcer pest."

Very often, in addition to the general aids above mentioned, we find special aids relating to particular cases. This is true in this instance. We observe to the left of the face of the second character, a small corkscrew figure which, according to our interpretation, must have *b* as its chief phonetic element. If we look below in the same column at the symbols for *Cib* and *Caban*, we see the same corkscrew figure in each, and find *b* as a phonetic element of each.

Turning next to the third column from the left of our figure, we observe that the upper character is the second *M* symbol of our letter-list (*Science*, July 22) and that immediately below it are five dots. As *Ho* is the Maya word for "five," we may translate the whole symbol by *Homah*, "To submerge, overwhelm, beat down and destroy dwellings and other things, and to unroof houses." The second character is slightly incorrect in the figure, as it tacks a slender x-shaped figure in the right portion of the glyph; and the little figure in front of the eye of the animal-head should represent a rod passing through a little circle. This character we render by the Maya word *Chaac* or *Chac* because the head is like that of the Chac figure as shown in the Troano Codex. *Chaac* or *Chac* signifies "The tempest or tornado." Connected with the time symbols below, the interpretation will be, "At this time, or during this period, occurred a tempest which unroofed houses and destroyed dwellings." The little character in front of the eye of the second character is the lightning symbol,—the proof, however, of this must be omitted as it cannot be given without the introduction of several figures.

The two characters at the top of the seventh or next to the right-hand column, we translate as follows: *Bulzah*, "To inundate or be inundated." *Tamculul*, "Deep, profound." That is to say, "At this time the land was inundated to a great depth." The upper part of No. 2 is imperfect in our figure in not having a slight opening at the right end.

This hunting out of the lexicons Maya words to suit characters is of course mere childish play unless based upon a legitimate and scientific process.

First, from the second element in the symbols for the east and west cardinal points and of the month *Yaxkin* I obtain the hieroglyph for *Kin* or *Ki'*. This forms the first part of the character

I have translated above—*Kilchalac*—and gives us the *ki* or *kil*; the little circle above (corrected as suggested) is Landa's *l*; in the hatched portion of the right character I find the *ch* which is seen in the symbols for *chicchan* and *Pax*, in one as *ch* (soft) and in the other as *x* (sh). Thus we have *kil*, *ch'*, *l*. Of the next character translated we find the *b* in the corkscrew figure in front of the face,—as seen in *Cib* and *Caban*. The *cimil* symbol is seen in the face character. The signification of the *chaac* symbol is determinable independently of its phoneticism. It is found in Dres. 71^e, 72^e, and 73^e, where its relation to the tempest is evident. The *Ho* in *Homah* has not been verified, the dots may be, and I am inclined to believe are, used as a determinative or simply to indicate the aspirate; I can only assert positively that it is some word relating to the effect of the tempest, the principal phonetic element of which is *m*, and that the five dots below give better results as *h* than with any other phonetic element.

As the crucial test of attempts to decipher is that the characters shall give like results in new combinations, I present some specimens to show that my interpretations hold good in what seems to be a sufficient number of cases to justify or at least to furnish some basis for the claim made. The incompleteness of our lexicons and the probability that the language in which the codices are written is archaic must be borne in mind. It is, therefore, more than likely that very many cases will occur where, although we may know the chief phonetic element of each part of a compound character, we cannot interpret the whole. This will undoubtedly be true unless there are indications of the minor elements which have not as yet been discovered.

Let us take, for example, the *m* of my letter-list—shown here in Fig. 2. It is the same as the symbol of the day, *Ymix*, in which we find *m* a leading phonetic element. Fig. 3 (Dres. 50^e)¹ is the symbol for the month *Mac*. It is possible and even probable that this symbol, which here varies slightly from the conventional form, should be rendered *Camach* or *Camaach*, signifying "the jaws," as this appears to be the true name of the month. I was at first inclined to believe that Landa's character for this month was but a conventional symbol probably intended to represent the mouth, but am now convinced that it is phonetic.

I have asserted in a previous communication that Landa's symbol for *ma* is correct, but I should have said that it will be correct if the strokes indicating the *m* are inserted in the little circles at the ends. In our Fig. 5, taken from the lower end of the line in Dres. 69, we see possibly the original from which this author's symbol for the month *Mac* was taken, as it is used at this point to indicate the month. Here we see these strokes very distinctly, and in the ends of the lower character the little parallelograms indicating the *a*, hence we render the symbol by *Maach*, an abbreviation of *Camaach*, as given by Perez. Is there not in this fact a very strong indication, if not positive proof, of phoneticism?

The compound character shown in Fig. 4 is found in Tro. 9^b and 10^c. It occurs in the latter twice, the parts, however, reversed in the parallel groups (as unfortunately in our figure), while in that of 9^b one part is placed above another. These variations do not necessarily indicate a difference in the phonetic value. Omitting the prefix *U*, this may be rendered *Makcab*, "To eat honey without chewing (that is, by sucking); to break into a bee-hive and steal the honey." As the parts *Cab* and *Mak* have the same signification when separate, the reversal of the parts of the symbol does not change the signification. By turning to the plates of the Tro. codex on which the symbols are found, the appropriateness of this rendering will be at once apparent. There we see the twisted red symbols denoting the fire, kindled beneath the bee-houses or hives, by which to smoke out the busy little workers. At least it is thus I interpret these figures.

Fig. 6 (Cort. 27^a, Tro. 14^b and ^c, etc.): *Xamach*, "A vessel, a large earthen pot." It is also applied to the clay vessel in which tortillas were cooked. After the introduction of metallic vessels

¹ The abbreviations, Dres. for Dresden Codex, Tro. for Troano Codex, and Cort. for Cortesian Codex, are used in the remainder of the article. The letters, a, b, c, and d, following the pages indicate the transverse divisions beginning with a for the upper one.

by Europeans, it was applied to an iron plate used to bake bread upon (Henderson). In the codices it appears to have been used chiefly as the name of a jar and of vessels in which meat was cooked; see, for example, Cort. 27^a, where there are four symbols and four vessels, and a cardinal point symbol to each, probably indicating the relative positions in which they were to be placed. On Tro. 15^c we find the same symbol occurring in five parallel groups, four of them, with a cardinal point symbol accompanying each. The middle one may be interpreted with a strong probability of being correct; *xaman xamach, theeth* — ? — ; “In the vessel toward the north the haunch or quarters — ? — .” The fourth character, indicated by the interrogation point, I am unable to interpret.

Fig. 7. Tro. 17^c. *Chim* (*Chimil*), “A bag, sack, a kind of net.” The object referred to is seen in the figure below the text, where it forms the net-like covering of the image-head in the vessel. The symbol in the same group — our Fig. 8 — which is a derivative of *Kal*, “to imprison, inclose, shut in,” also corresponds with what is seen in the figure.

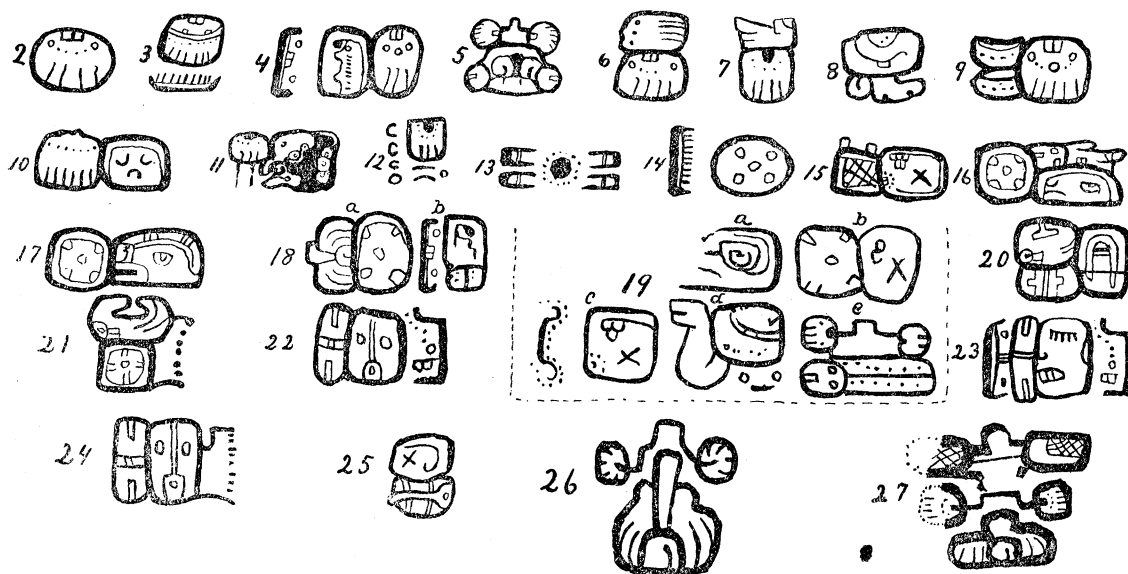
Fig. 9. Tro. 31^b. *Zum* or *Zuum*, “rope, cord, line,” and Fig. 10, same group, *Xel* or *Xelem*, “to part, separate, cut, divide,” have been referred to above.

lay a beam across a place, to traverse.” Reference to the plate indicated will make apparent the appropriateness of this interpretation. In this symbol the *m* character is abbreviated to the upper or dot-surrounded portion alone.

As our Fig. 8 without the suffix is the well-known symbol for 20, which in Maya is *Kal*, we have two places in which the phonetic equivalent applies. The signification “to imprison or shut in” is also appropriate in Fig. 4 of my communication in *Science*, July 22, which gives us a third combination.

Now let us take the *b* character as given in my letter-list. It is given by Landa as his second *b* substantially as found in the codices; also in his symbols for the months Pop and Kayab as repeated in Dres. 46^c and 48^c. The following examples of its use in the codices are given with interpretations which I believe to be substantially correct. As those who are interested in the subject can make the comparisons and judge of the appropriateness of the renderings without explanations, I will make my comments brief.

Fig. 14. Tro. 12^b. Omitting the prefix *Ca*, I interpret *Bon* (*Bonah*), “to paint, dye, tinge, stain.” Using the *Ca*, which has numerous significations, and the character which follows, shown in our Fig. 15, which we render *Xelche*, “groove or crack in the



Figs. 2-27.

Fig. 11. Dres. 14^b and ^c and 46^b. *Maax*, “monkey, ape, imitator.” The two dotted lines which fall in this symbol from the *m* character, I take to be indications of the double *a* and not of the *x*. The face, I think, is a mere conventional symbol. The personage with which this symbol appears to be connected is distinct from the dark figure which I have in a former publication assumed to be *Ekchuah*, the god of merchants, which is accepted by Rosny and Dr. Schellhas.¹

Fig. 12. Cort. 11^b. *Hahaymuc*, “To bury or inter superficially;” also “A stab or thrust given obliquely.” The first definition applies very well to the act of planting corn shown in the figure below. The second agrees equally well with the idea of dibbling holes into the ground with the curved stick which the planter holds in his hand. Attention is also called to the fact that the sign of aspiration is duplicated in the symbol and the *h* is repeated in the word. The parallel passage in Tro. 31^b (left group) appears to have the signification of the second of the above renderings, though different symbols. We may remark in passing that this parallelism in passages and many other things show that the Cortesianus is not a part of the Troano, but a distinct codex, notwithstanding the divided “title-page.”

Fig. 13. Cort. 20^b. *Hamah*, “To make a breach in a rampart; to break down or break open;” or *Hemeh* (from *Hem*), “To

wood,” we obtain the following: “Paint twice the grooves in the wood,” or “the two grooves.”

Fig. 16. Tro. 31^d: *Bulahaan* or some derivative of *Bul*, *Bulah*, “To submerge, overwhelm with water.” The character found immediately below, shown in Fig. 17, may be rendered by *Ban* (*Banah*), “To demolish, throw down, level with the ground.” As the long-nosed god (Tlaloc?) is seen below overturning a jar of water on the sprouting corn, the appropriateness of the rendering is apparent.

Fig. 18 (a and b). Tro. 3^b. These two characters we translate *Yib-u-cab*, “To liquefy, melt, dissolve the honey.”

Fig. 19 (a-e). Tro. 35^c. The characters *a*, *b*, *c*, *d*, *e*, which form one group, may be rendered with a probability of being correct, — following the order of the letters, — *Kuch bikyah hak* — ? — *ma-lah*, “The vulture moves from one side to the other with a tremulous motion in a wonderful manner — ? — without repeated buffetings.” The first character of the group is not included, as it is well nigh obliterated; *a* is a conventional symbol, and I am unable to suggest the interpretation of *d*.

As our paper is necessarily limited, the above must suffice at present as examples of tracing the combinations of a single character. That those mentioned appear in numerous compound symbols which we are, as yet, unable to decipher, will be admitted; but this was to be expected, and must continue to be true until more complete lexicons of the language are obtained, or until some

¹ Brasseur, under *Akab-Max*, speaks of a phantom or hobgoblin of this name which he says signifies the “Great Monkey of the night.”

one as familiar with it as with his native tongue takes hold of the work.

We will now call attention to some characters, the interpretation of which seems to give us a proper clue to the signification of the subjoined figures, sometimes very different, however, from the conclusion likely to be reached from a study of the figures (pictures) alone.

Let us take the leading symbol in the "baptismal" scene shown in Tro. 20^c. There are in this series four groups, each assigned to one of the cardinal points; this symbol, which is our fig 20, is found in each, hence must indicate some act, thought, or thing applicable to each of the figures below, which represent women apparently sprinkling children. We observe that the upper character of the symbol is the same as that of our Fig. 21, the symbol for *Chikin*, "west;" that the one below it is Landa's *H*, and that to the right his *i*. Putting these together we have *Chic-ha* (or *Chich-atah*)—*i*, or *ich*; "To rinse, cleanse, or wash with water, the child," or "the face."¹ A very simple and ordinary operation, but, like everything else which the priests could bring under control, was to be attended with certain religious or superstitious observances. Possibly this may refer to something of a more public character than the cleansing of children in the household.

In the middle divisions of Plates 24 and 25 Cortesianus, we see what we take to be a series of enclosed graves or sepulchres, the inclosure or vault being of wood fastened by thongs or withes. The dead are seen within, but on top of each a person stooping or lying down. What does this signify? Judging from the figures alone, several different and apparently equally applicable answers might be given. Referring to the text above (Plate 25), we observe the characters shown in our Figs. 22 and 23. The first (Fig. 22) we translate by *Paa-laahal* from *Pablaahal*, "To rip open, unseam; to cut, break or burst open." The second (Fig. 23) by *U-Paa Cimilhi*, "the enclosures of the dead." The article borne by the middle figure, Plate 25, appears to be the same as those in the hands of the individuals Tro. 23^c, where they appear to be used in severing the trunks of trees. Although odd-shaped implements to be used for this purpose, I have supposed them to be what may be termed saws, fitted with flint teeth. At any rate, they are used in some way in working in wood. Fig. 24, from same series, is probably a derivative of *Paaxal*, "To demolish, etc."

In Dres. 1^c the figure shows two individuals drawing a seine in which is a single fish, over which is the character shown in our Fig. 25, here turned on its side as in the original. This contains the same elements as No. 3, Fig. 2, *Science*, July 22, translated *Outz*, "the turkey," but here they are reversed. Turning to Perez's lexicon, we find that *Tzac* is a little fish so named; Brasseur says a little fish resembling a sardine which inhabits the senotes.

As the symbol for *Xaman*, "north," Fig. 26 contains the characters for *ma* and *y* according to my theory, and lacks the *x* symbol, the question arises, How is this to be explained? That some of the day and month symbols, if phonetic, are abbreviated will become evident to anyone who will carefully study them. That the symbol for *Nohol*, "South," if phonetic, is also abbreviated must be admitted. The same is true of that for "north." Turning to Tro. 30^b, we find the symbol shown in our Fig. 27, which is here used for North. In each wing of the upper character we see the hatching indicating *x'x*; the middle one *ma*, and in the lower one the *y'*. Supplying the subordinate elements we have *xax-ma-yaam*, "the side without an opening" or "door." As *Nohol* signifies "the great door," this contrast is consistent and gives us a Maya name for north, and does away with the necessity, as Charencey supposes, of resorting to a foreign language for the word.²

NOTES AND NEWS.

At last there seems to be an awakening among Americans as to the food they eat, if we may judge from the interest taken in the food exhibitions which have been held of late years. A most

attractive exhibition of this kind has been opened at the Madison Square Garden in this city, and has combined with it a series of lectures, by Miss Parloa, on cooking. The exhibition ranges from a dairy—cows and all—to the toothsome buckwheat cakes. One thing brought out clearly is the simplification of housekeeping brought about by the use of the partially prepared viands now in the market. But we would suggest that substitutes, occasionally shown, can never take the place of the real articles.

—A European correspondent informs us that a Russian expedition is now in north-east Siberia for the purpose of bringing back a mammoth which has been discovered there frozen in a perfect condition. The writer adds that he has strong hopes the naturalist in charge of the expedition may discover the eggs of Ross's Rosy Gull (*Rhodostethia rosea*), as yet unknown to oölogists.

—The Bausch & Lomb Optical Co., Rochester, N. Y., recently issued the thirteenth edition of their "Illustrated Catalogue of Microscopes, Objectives, and Accessories." This firm has now made and sold ten thousand microscopes, not including thousands of dissecting microscopes, which means that their instruments are in very wide use in this country, and the firm takes pleasure in stating that a European demand is now growing, showing an appreciation of their work abroad. By contract with the well-known maker, Carl Zeiss of Jena, the Bausch & Lomb Optical Company are made the sole manufacturers, under the patents, of the Zeiss photographic lenses.

—The School of Political Science of the Brooklyn Institute of Arts and Sciences, for which provision has been made by the Department of Political Science of the Institute, and some account of which was published in *Science* for May 20, will be formally opened with a public meeting at Association Hall, on Monday evening Oct. 10. Mr. John A. Taylor, president of the department, and other well-known citizens of Brooklyn, who are interested in the movement, will address the meeting. At the same time the courses of study established by the committee on the school will be announced and described. The committee on the School of Political Science comprises some of the most successful business men in the city, as well as distinguished representatives of the professions and of the prominent educational institutions of Brooklyn, between which and the institute a cordial understanding and co-operation exist. The committee have taken great care in the selection of instructors for the school and the arrangement of the courses of study, and are well satisfied with the results thus far attained. The faculty of the school, so far as selected, consists of Charles H. J. Douglas, Professor of Political Economy, and Lewis G. Janes, Professor of Civil Government. Dr. Janes is well and favorably known in Brooklyn as the president for several years past of that very successful organization, the Brooklyn Ethical Association. He brings to his work in the school maturity, enthusiasm, and thorough scholarship, and will make his courses in civil government both popular and instructive. Professor Douglas, who has been secretary of the Department of Political Science since the resignation of Professor Frank J. Goodnow of Columbia College from that position two years ago, will have charge of the classes in political economy. He is a graduate of Brown University, and has studied at Yale, Johns Hopkins, Michigan, and Columbia, receiving from the last-named institution the degree of Doctor of Philosophy, and an appointment as Seligman Fellow in political science. It is expected that Dr. Douglas's work at the institute will be as successful and popular as it has been at the Brooklyn Boys' High School, in which for several years he has had charge of the work in political science. The matter of raising a permanent fund for the School of Political Science is one that should appeal strongly to those possessed of means and interested in the education of our youth in the duties of citizenship. A guaranty fund has been raised, sufficient to insure the support of the school irrespective of the size of classes for the first year; but a permanent endowment of \$50,000 or \$100,000 is needed to put the school in the best possible condition to do the work proposed by its projectors.

¹ Perez limits the signification of this word chiefly to rinsing the mouth, but Brasseur gives it a more general meaning.

² Actes. Soc. Philol., Tom. 20, p. 187.